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Management of a Construction Project
A Guide for Grantees

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Guidance is also applicable to wastewater treatment works construction projects which have not received EPA grant assistance

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Preface

Managing a successful wastewater treatment works construction project is no small undertaking. Any one who has done so could give valuable advice on management techniques. This guidance is a summary of that kind of experience. Based on a review of particular approaches that worked well in the U.S. Environmental Protection Agency (EPA) construction grants program and specific areas where care must be exercised, this guidance discusses techniques that can help a municipal official responsible for a project to avoid problems that others have encountered.

This guidance recommends the use of a project manager, a management team concept and the development of a management plan. It also suggests ways for the project manager to handle project activities by anticipating them in the management plan. The guidance deals with preparing for the final audit of the project, which is a test of how well the project has been managed. The term construction project in the EPA construction grants program extends from the planning of a facility through design, building and start-up. This guidance relates to the part of the process where the facility is actually built and the majority of project dollars are spent. The most effective construction project management system will only succeed if adequate planning and design have been done. The project will only be worth constructing if there is adequate preparation for operating the new facility. For a more extensive discussion of the entire construction grants process, a copy of the latest edition of the EPA publication *Construction Grants 1985, July 1984,* should be requested.

This guidance has been prepared for the municipal official responsible for the project and much of it can also serve as a reference for the project manager. It is intended to present highlights and leave the extensive detail on project management to the many other available texts on the subject. Much of this guidance is also applicable to wastewater treatment works construction projects which have not received EPA grant assistance.

[40 CFR 30.200]

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Introduction

EPA's goal, as part of its mandate to protect America's waters, is to ensure that its construction grants funds are being used to complete properly designed, well constructed wastewater treatment systems. In that regard, the Agency has identified two concepts which are generally associated with the successful use of grant funds. These are: (1) that good project management and management planning has proven most likely to result in a successful construction project, and (2) that the purpose of a construction grant is most likely to be achieved when the municipal official responsible for the project is held strictly accountable for expenditures and ultimate performance of the new facilities.

The Management Plan

EPA regulations require on construction grants awarded after May 12, 1982, that the municipality demonstrate the capability to manage construction of the project. The reviewing agency (EPA or delegated State agency) will review and approve the municipality's project management capability demonstration as a part of grant oversight. This guidance identifies management issues and ways in which they can be planned for and addressed. It also includes appended Management Plan Worksheets which can be used to document the municipal project management system. Since there are many ways to document management capability, use of these worksheets is optional.

[40 CFR 30.301(b), 35.2104]

The Project Management Concept

The key to good project management is to designate a project manager to represent the municipal interests by taking charge of all grant and project-related activities. This person should be readily available full-time as part of the municipal government to deal with project matters, given the necessary authority to oversee and coordinate all project activities, and may, depending on the size and complexity of the project, be supported by a team of professionals who provide advice and assistance in specialized areas. A qualified project manager must be available full-time or project management responsibilities will be divided and lack coordination.

[40 CFR 30.301(a)(1), 30.309]

Municipal Accountability

EPA pays for a large share of wastewater treatment system construction through its construction grants program. However, a substantial municipal share of costs can become even larger if costs for which reimbursement is requested are disallowed at final audit due to inadequate management practices. These can lead to such problems as cost overruns, unsafe work sites, construction errors, failure to meet performance requirements, increased user costs or construction delays. Mismanagement may also result in EPA sanctions such as a stop-work order, which in cases of a serious problem would require stopping the work or activities identified in the order and taking all reasonable steps to minimize costs of the work. If the problem cannot be resolved, EPA could ultimately terminate or annul the grant agreement if, for example, there is no substantial progress on the project or project completion is inordinately delayed without good cause, or the grant is obtained by fraud, misrepresentation or improper administrative procedures.

[40 CFR 30.610, 30.900, 35.2005]

References to Federal Regulations

EPA regulations cited where applicable in the text are found in Title 40 of the Code of Federal Regulations (40 CFR). References from the cited regulations in Part 30 (General Grant Regulations) were published on September 30, 1983; Part 33 (Procurement Regulations) on March 28, 1983; and Part 35 (Construction Grants Regulations) on February 17, 1984. The municipal official responsible for the project should contact the State construction grants agency for the regulatory references which are appropriate for the date of the grant award and obtain copies of all three regulations for review prior to commencing work and for reference.

Duties and Responsibilities of the Participants

The project manager's function is that of general manager who leads the project management team of specialists providing the administrative, technical, financial, and legal support for management of the project. The construction manager and field personnel, including a resident engineer and inspectors, support the management team. The construction contractor, subcontractors and suppliers would not be considered part of the municipality's project management team.

The size of the project management team structure will vary to suit each situation. However, the project management support functions required are the same on small or large projects and are common to all successful project management teams.

Because the staff in a small municipality is likely to become overloaded when project-related duties are incorporated into their routines, temporary employees or consultants may be needed to provide the required support.

An example of a relatively small project management team organization is where the project manager does the administrative support work and much of the financial work either personally or with temporary help. Technical support would be provided by a technical advisor, probably the consulting engineer who designed the project, and who would also provide one or more inspectors. Legal advice and the balance of financial work and advice would be provided by the municipal counsel and municipal financial officer respectively.

On the other hand, the larger municipality with a more complex government structure may already have the specialized personnel needed to manage wastewater treatment project construction. The project manager and support team members may be available by reassignment within the municipal government.

An example of a very large project might be one managed by the project manager using a construction management services firm for the more complex project monitoring. Administrative support could be a department of clerks supervised by an office manager. Technical support might still be provided by one or more consulting engineers, depending on the number of contracts, supported by field personnel including resident engineers, inspectors, specialized testing personnel and field office clerical help. Financial support could be a department of bookkeepers working for the financial advisor. Legal support might be provided by one or more law firms coordinated by the municipal counsel.

The project manager can help organize the project management team and should be designated by the time the bidding documents are being completed. The municipality may want to consider designating the project manager earlier for design coordination and assistance in preparing the grant application.

Specific responsibilities should be assigned to each party active in the project through written agreements which clearly define the specific services expected and the responsibilities of each party. This can be accomplished by employment agreements with municipal employees or by professional contracts with outside parties.

The project manager function is an allowable cost in the construction grants program, if it receives prior approval. For this reason, the municipal official responsible for the project may wish to discuss it with the State construction grants agency before obtaining or assigning the project manager. In order for it to be considered an allowable cost, it is essential that the project manager's responsibilities be specifically defined and differentiated from those of the technical advisor and construction manager.

[40 CFR 30.302, 30.308, 35.2040, 35.2115]

Authorized Representative

The authorized representative is the municipal official ultimately responsible for the project and therefore the management of the construction process.

The authorized representative can reduce the possibility of problems which would keep the project from meeting its performance standards by incorporating assurances into the project management team's employment agreements or professional contracts. Similar protection can be provided by incorporating warranties or indemnity clauses in the construction contracts, although extended warranty periods may result in costs unallowable for EPA participation. The critical factor is that one person must be in control of the entire project. If a project manager is not designated, the authorized representative should be prepared to assume the project manager role full-time.

[40 CFR 30.301(a)(3), 30.610, 35.2214]

Project Manager

The project manager is responsible for overall supervision and coordination of the project on behalf of the municipality, so that the project manager should be a municipal employee if possible. One alternative, particularly on small projects where the additional expense would be proportionately high, is to seek a project manager from an existing State or regional organization. Another would be to use qualified retired people who might be willing to work for a token salary to cover expenses.

Candidates should be given a complete description of the responsibilities associated with this position. In many cases, it may be

possible to offer the project manager the management of the completed facility. The person selected, whether an existing municipal employee or obtained specifically for the project, should preferably have experience in dealing with regulatory agencies, Federal grants, construction projects, and should have the ability to coordinate the project management team effectively.

The project manager does not need to be an engineer or a specialist in any of the other fields of the project management team, although some related managerial experience appropriate to the size of the project is expected. However, the individual must have the ability to effectively use technical, legal, and financial advice; have proven administrative capabilities; be self-motivated and stimulated by challenges; recognize when the advice of a specialist is needed and use it to help resolve problems; and have enough knowledge of accounting practices to oversee the financial functions.

The project manager's responsibilities include:

- Coordinating with the reviewing agency for clarification of grant program requirements.
- Recommending an organizational structure and organizing and actively leading the project management team in meeting responsibilities established in the management plan.
- Developing, monitoring, updating and reporting on the project budget and schedule.
- Ensuring that a proper recordkeeping system is in place to facilitate project management and audit.
- Expediting correspondence and other paperwork for necessary actions through the management structure.
- Upon receiving notice, instituting the investigation and documentation of the facts surrounding construction contractor claims, obtaining technical, financial and legal advice, responding in writing as outlined in applicable contract provisions, and preparing for timely resolution of claims through negotiations, arbitration or litigation.
- Processing change orders expeditiously and assuring timely issuance of the Notice to Proceed, if required, for each change order.
- Reviewing and taking necessary action on reviewing agency inspection and construction management evaluation reports.
- Ensuring preparation of and reviewing periodic progress reports to the municipality and the reviewing agency.
- Ensuring preparation of the invitation for bids.
- Providing financial information to enable the municipality to finance and recover its share of project costs and set user charges which will adequately cover operation, maintenance and replacement of the facilities being constructed.
- Ensuring that receipts and disbursements are processed and grant reimbursement requests are prepared and forwarded in a timely manner.
- Ensuring that financing is available to provide adequate cash flow.
- Ensuring that contract provisions specifically define services expected and responsibilities of the construction contractor, and applicable liability, performance and warranty requirements.
- Ensuring fulfillment of construction contractor responsibilities.
- Ensuring that all land titles, easements, rights-of-way, licenses, and permits are obtained in a timely manner and in accordance with State and Federal requirements.
- Ensuring that procurement requirements are met.
- Performing or overseeing construction management.
- Any other actions required for overall project management.

Construction Manager

While the project manager must provide the basic construction management direction for any project, many of the detailed cost estimating, schedule monitoring, and quality control systems on large or complex projects may justify retaining a construction manager. Many engineering and construction firms offer construction management services which help in monitoring the project.

It is important to recognize the difference between the role and responsibilities of a construction manager and the support provided by the technical advisor during the building of the project. A construction manager assists the project manager to control project costs and keep the work on schedule by:

- Developing and updating an overall project schedule within which the construction contractors must develop their detailed schedules and complete their work.
- Evaluating the construction contractor's detailed schedules and workplans that optimize progress by taking into account necessary sequences and the critical path of construction activities.
- Reviewing construction contractor staffing plans to ensure that labor allocation is sufficient to enable the project to stay on schedule.
- Providing advice on trade practices, and the suitability and availability of various construction materials.
- Making recommendations concerning bid packaging to increase competition.
- Expediting delivery of equipment which the municipality is prepurchasing directly.
- Coordinating claims management.
- Any other actions required to support overall project management.

Administrative Support

The project manager may delegate certain administrative functions to a staff member in cases where the project size or complexity warrants it. These responsibilities include the following:

- Helping to prepare invitations for bids and contracts.
- Assisting in the development of a recordkeeping system.
- Maintaining project and contract records.
- Preparing progress reports.
- Preparing and forwarding grant reimbursement requests to the reviewing agency.
- Maintaining a schedule of project reports to ensure timely submission.
- Providing other administrative support as assigned.

Technical Advisor and Support

It is common practice for municipalities to procure a consulting engineering firm to act in the capacity of the technical advisor. The selection of a competent and experienced technical advisor is an important decision to ensure that the project is well constructed, completed on time and satisfies applicable State and Federal requirements. The technical advisor may be the engineer that designed the project or another one procured through the competitive negotiation process. The technical advisor does not need to be located at the project site but must be readily available to the project manager and resident engineer or inspectors. The traditional technical advisory and support services provided during the building of a project include:

- Overseeing inspection of the construction to ensure completion and conformance with the construction drawings and specifications including review of shop drawings.
- Interpreting the intent of the plans and specifications.
- Providing expert opinion to the project manager on changes to the project, including the preparation of independent cost estimates.
- Overseeing the resident engineer and inspectors.
- Assisting the project manager with overseeing and updating the overall project schedule when there is no construction manager.
- Providing detailed documentation on construction progress in periodic progress reports to allow the project manager to perform oversight functions.
- Breaking down construction costs by eligible and ineligible categories to provide the project manager with the documentation needed to record costs appropriately.
- Certifying construction contractor work performed for progress payments.
- Establishing procedures for shop drawing submittal and review.
- Maintaining current record drawings (sometimes called as-built) and shop drawings at the project site. Record drawings are those on which the field personnel continuously mark changes which may be made as construction progresses.
- Overseeing contractor performance by periodic review of plans and specifications, shop drawings, and construction schedules.
- Preparing adequate documentation, independent cost estimates and cost/pricing analyses of change orders.
- Negotiating change order scope and cost with the construction contractor if delegated by the project manager.
- Reporting any disagreements with contractors over current or potential change orders or claims.
- Providing technical support in disputes negotiations or litigation.
- Periodically auditing construction contractor payrolls for Davis-Bacon compliance.
- Maintaining a listing of warranties that are to be transferred to the municipality.
- Estimating operating costs, resource needs, and timing of plant start-up as well as operation and maintenance needs such as direct and indirect staffing, materials, utilities.
- Assisting in direct prepurchase of major equipment or systems and coordinating installation by the construction contractor.
- Overseeing plant start-up.
- Supervising the one-year operator training and performance certification period.
- Providing advice or support requiring a professional engineer.

[40 CFR 35.2204(b)]

Resident Engineer

The resident engineer is the technical advisor's on-site engineering representative, oversees inspection and quality control, handles field communications with the construction contractor, supervises and coordinates the work of the inspectors and is responsible for periodic reports to the project manager. The resident engineer is generally a registered professional engineer, with experience in contract administration and field engineering on the type of project being built. The resident engineer would usually be an employee of the technical advisor. Because of the difficulty of hiring qualified resident engineers and inspectors for a limited term, using municipal employees for these functions is not generally recommended.

Municipalities managing medium to large construction projects should use a resident engineer to perform the technical advisor's field functions, while on smaller projects the technical advisor might supervise the inspectors more closely and perform the resident engineering field functions as needed.

Inspectors

The grant application includes an assurance that the municipality will provide and maintain competent and adequate inspection of the project during all significant events. Inspection services should usually be provided by employees of the technical advisor. The project manager should ask the technical advisor how many inspectors are needed and require at least one, generally full-time.

The inspector is responsible for preparing the daily inspection reports which should include at least the following, preferably on a standardized form:

- Description and location of the work.
- Construction personnel and equipment on-site and description of activity, including idle personnel or equipment.
- Quantities of work performed, equipment received/installed and materials consumed, including a report of none if appropriate.
- What was inspected or tested and by whom.
- What was or was not in compliance with the contract documents and who it was reported to.
- Notices to the construction contractor for improper work not corrected that day and any corrective actions taken.
- Visitors.
- Weather conditions.
- Enough detail that project events can be reconstructed to adequately resolve all construction contractor claims.

[40 CFR 35.2204(b)]

Financial Advisor and Support

The financial advisor should make sure that financial information is presented in a way that supports decision making and facilitates audits. The project manager serving a small municipality might personally assume part of this function while in a larger one the chief financial officer will probably provide this function.

Specific responsibilities include:

- Identifying short and long term financing capability, and sources of funding.
- Arranging financing of the municipality's share of project costs with the assistance of financing specialists if necessary.
- Assisting in developing project budget, cash flow and financial accounting and reporting systems.
- Reviewing financial transactions, budget/expense reports, and fund levels to ensure that adequate funds are available to complete the project.
- Reviewing change order cost/pricing analyses.
- Ensuring adequate internal checks and balances.
- Accounting for eligible and ineligible costs.
- Providing budgetary analysis.

Financial support should be under the general supervision of the financial advisor. Specific duties of the support personnel include:

- Keeping the financial accounting books.
- Preparing cash flow projections.
- Processing receipts.
- Preparing vouchers and disbursements.
- Creating a system to integrate project and municipal accounts.
- Providing early warning on potential cost overruns.
- Assisting in meeting financial reporting requirements.
- Providing any support requiring an accountant.

[40 CFR 30.301(a)(4)]

Legal Advisor

An attorney may only need to be committed part time to a wastewater treatment construction project of any size. The bulk of the legal advice needed is in the area of contract law, although a lawyer may also have to be consulted on issues of legal authority, acquiring property and easements, procurement, and resolution of disputes. If a legal firm is retained, the assignment of a designated attorney should be sought in order to maintain continuity of claims management and consistent interpretation of all contracts. The legal advisor should be familiar with contracting procedures on Federally assisted projects and be accessible to the project manager when unforeseen needs arise.

The legal advisor should have responsibility for the following activities:

- Establishing legal authority for financing, contracting, construction and operations.
- Engaging and overseeing the work of bond counsel in financing the municipality's share of project costs.
- Reviewing bids for insurance coverage, bonds, minority and women's business enterprise requirements.
- Assisting in developing and negotiating contract provisions and reviewing for potential legal problems and compliance with EPA regulations, State and local laws.
- Reviewing the procurement process.
- Advising on land titles, easements, permits, licenses, appraisal arrangements, significant change orders, work stoppage, schedule enforcement, disputes, and cost overrun claims.
- Securing property titles.
- Assisting in ensuring fulfillment of contractor responsibilities, and protection of the municipality against potential liability.
- Periodically making project reviews with the project manager to assess potential areas of claims or litigation and recommending corrective action.
- Assisting in negotiation of disputes.
- Litigating non-negotiable contract and grant disputes.
- Any support requiring an attorney.

[40 CFR 30.301(a)(7)]

Construction Contractor and Subcontractors

The construction contractor and subcontractors are responsible for building the facility and installation of equipment in compliance with the contract documents which consist of the construction contract and attachments, plans and specifications. The contract documents should include provisions for:

- An agreement that the construction contractor will perform all work in accordance with the plans and specifications.
- A requirement to guarantee that work is free from all defects due to faulty materials, equipment, or workmanship for a period of at least one year from the date of substantial completion of the work performed.
- An agreement to promptly remedy any defects and damage that may result from such defects.
- A requirement for maintaining a current construction schedule with the level of detail based on project size and complexity.
- Recordkeeping requirements for demonstrating that the work conforms to Federal regulations in effect at the time of grant award.
- Provisions relating to liability and performance requirements and avenues of recourse in cases of non-compliance Primary attention should be on the quality of the work, not the method or order of performing it. Directing the construction contractor should only be done as a last resort and directly by the project manager, because it may lead to claims of interference, increased costs and the municipality's assumption of liability.

Subcontracts between the construction contractor and subcontractors to perform specific construction tasks are the responsibility of the construction contractor. Thus, the municipality should expect the construction contractor to act in cases of subcontractor non-compliance and should not deal directly with subcontractors.

Construction contractors must be selected through an open competitive bidding process in accordance with State law and Federal regulations.

[40 CFR 33.295, 33.1030(13)]

Equipment Suppliers

Equipment suppliers are responsible to the construction contractor for fabricating and delivering equipment, providing warranties or bonds for product performance, furnishing the shop drawings for equipment specified and providing a comprehensive listing of supplies and equipment parts needs. Suppliers should send shop drawings to the construction contractor or subcontractor for forwarding to the construction contractor, who is responsible to approve and forward them to the technical advisor for review and approval.

Equipment and supplies procurement are a matter between the construction contractor and equipment suppliers except for major equipment or systems which the municipality prepurchases directly.

Performance warranties required in the specifications to cover equipment through early operation must be assignable to the municipality.

Although extended warranties are available, the cost of warranties are grant allowable only through startup and the one year performance period if the costs are reasonable and necessary for ensuring achievement of an affirmative certification.

[40 CFR 33.1030(13)]

The Reviewing Agency

While EPA maintains overall responsibility for ensuring that the municipality adheres to Federal requirements, EPA has delegated much of the responsibility for the day-to-day management and administration of the construction grants programs to the States under a delegation agreement. Some activities such as grant awards, final audit determinations, final resolution of disputes and bid protest appeals remain the responsibility of EPA. Most of the direct project activities are either delegated to a State which is then the reviewing agency, or performed by the U.S. Army Corps of Engineers (CoE) under an interagency agreement with EPA.

The reviewing agency will make a number of different visits which are intended to provide oversight, help improve project management, and protect State and Federal interests. They include a Project Management Conference (PMC), Construction Management Evaluation (CME) of selected projects and interim inspections. These are described under CONFERENCES WITH THE REVIEWING AGENCY. The reviewing agency is the municipality's contact point for information or guidance on any issues or problems that may arise in the administration and management of the construction grants project. While the reviewers will endeavor to work with the project manager regarding the project, the municipality remains ultimately responsible to see that it satisfies the requirements of the grant and the Clean Water Act.

Preparing for Construction Contract Award

Preparation for the construction phase of the project should start with organizing the project manager's support team and field personnel. In addition, the following items were identified as important areas for the project management team's attention before construction contract award when project management performance was analyzed nationwide:

- Procurement
- Municipal Coordination
- Records
- Accounting and Financial Control
- Cash Flow
- Permits
- Bonding and Insurance
- Worksites

Organizing the Project Management Team

When the project management team members have been selected, they should be briefed as a group by the project manager. At the meeting, the project manager should provide each team member with a summary of their major responsibilities and duties, an organizational chart, the project schedule, names, addresses, and telephone numbers of key contacts. This information should already be in the management plan. The project management plan and organizational structure should be reviewed in detail to ensure that all team members have the same information and understand their roles and the types of interaction that will occur later, such as responding to requests for information or advice.

The project manager should make sure that team members understand the lines of communication. For example, payment requests, change orders, and quality control actions should originate in the field. Claims procedures should provide for opinions by the designer and resident engineer. Change orders should include review by the designer so that they do not compromise the intent of the design.

The project manager should make sure that everyone who should participate in resolving an issue is kept involved, and not become overcommitted in problems that could be resolved by others. For example, if a subcontractor comes to the project manager with a complaint, the subcontractor should be required to seek a solution from the construction contractor who can then solve the problem or bring it to the attention of the project manager if necessary.

[40 CFR 30.302, 30.308, 35.2040, 35.2118]

Field Personnel and Testing

The project manager must ensure that work in process by construction contractors is inspected for conformance with the plans and specifications. If work is performed without inspection, its quality cannot be assured. If errors are not found and later result in damage, the construction contractor may avoid responsibility for repairs.

All construction inspection personnel should conduct their activities in accordance with inspection guides provided by the technical advisor and keep detailed records of observations. Foundations of buildings and other structures as well as the placement of reinforcing steel, all concrete pours, pipe jointing and pressure tests, and equipment startup require special attention.

Testing of materials for conformance to the specifications should be conducted by an independent certified laboratory wherever practical. Where testing must be conducted by construction inspection personnel, they should be certified and thoroughly familiar with test procedures. Under no circumstances should any portion of the quality control testing be conducted by the contractor or subcontractor. Costs for inspection and testing are generally grant eligible if included in the grant.

[40 CFR 35.2204(b)]

Procurement

The EPA procurement regulation is specific and detailed, so that the project manager needs to understand it thoroughly including the relationship to the date of grant award.

The municipality has the option of self-certifying its current procurement system if it meets the intent of EPA's procurement regulation.

Different types of procurement procedures and contracts are commonly used for procuring engineering, legal or other professional services than are used for construction contractors.

[40 CFR 33.205]

Self-Certifying Procurement Procedures

The project manager should review the municipality's procurement system against EPA's procurement regulation, which should be obtained from the reviewing agency. If the authorized representative believes that the procurement system meets the intent of EPA's procurement regulation, this may be self-certified by completing, in the affirmative, the Procurement System Certification Form (EPA Form 5700-48). This action allows the project manager to undertake procurement actions without prior review, but if there is a failure to comply with all procedural requirements, the problem may not be identified until audit when it would be too late to make corrections. Failure to comply with the procurement regulation may mean that costs of contracts not properly procured will be disallowed.

If the authorized representative chooses not to certify the municipal procurement system, proposed procurement actions are subject to the EPA procurement regulation and pre-award review. The reviewing agency will determine the manner, timing, and extent of its review and the municipality must submit procurement

information requested by the reviewing agency on all contracts greater than $10,000. However, all procurement actions should be documented, as they are subject to audit.

[40 CFR 33.110]

Procuring Professional Services

The authorized representative must decide on the methods to be used for selecting any professional services firms for technical advisor, legal advisor, construction manager, or others. The EPA procurement regulation does not apply to selection of new municipal employees to fill project management team roles.

The engineer that planned or designed the project has the advantage of being thoroughly familiar with the project, but that firm may or may not offer the most suitable or cost effective technical advisory services.

The engineering firm that provided facility planning or design services may be retained if:

- The municipality received a facilities planning or design grant and selected the engineer for it in accordance with EPA's procurement regulation which was in effect at the time of grant award; or,
- The reviewing agency approves noncompetitive procurement in accordance with the current procurement regulation for reasons other than the municipality simply wanting the same firm; or,
- The authorized representative is able to document and certify that the following conditions have been met:
  - —The initial Request for Proposals (RFP) clearly stated the possibility that a subagreement could be awarded for engineering services during building of the project; and
  - —The firm was selected for facilities planning or design in accordance with the requirements for competition with documentation, and using either the EPA small purchase, formal advertising or competitive negotiation procedures; and
  - —No conflict of interest exists with the engineer.

If the authorized representative chooses to solicit proposals for professional services, a public notice of the need for services, the scope of work, and a request for proposals are needed. The proposals must be evaluated according to the criteria published in the request for proposals. Criteria should be based on experience of the firm and the staff to be assigned to the project in providing the services needed, a discussion of contract management skills and proposed methods, a listing of similar contracts, and the price for the proposed services. Depending on which method was specified in the request for proposals, the award may be based on initial offers or negotiated equally with all best qualified firms to allow them to present their best and final offers. The contract is to be awarded to the responsible firm whose proposal is most advantageous to the municipality considering price and other factors stated in the public notice.

The alternative to this procedure is for unpriced proposals to be requested from firms selected from a prequalified list or from a request for qualifications. The list must be updated every six months and meet certain other regulatory requirements. Based on evaluation of technical proposals, they must be ranked and an attempt made to negotiate compensation with the most qualified firm. If unsuccessful at agreeing on the compensation, negotiations must be terminated and negotiations started with the next most qualified firm, never going back up the list.

Noncompetitive negotiation requires prior approval from the reviewing agency and is acceptable only under very limited circumstances.

[40 CFR 33.505, 33.525, 33.605, 33.715]

Procuring Construction Contracts

The project manager and technical advisor will need to decide on the number, size and timing of construction contracts and direct prepurchase actions.

With a single contract, one construction contractor handles the entire construction process. The contract is awarded to the lowest, responsive, responsible bidder. A responsive bidder is one whose bid responds to the requirements in the bidding documents. A responsible bidder is one who has the financial and technical resources, satisfactory performance record, adequate accounting procedures and is willing to comply with Federal labor requirements. The contractor then is given access to the site and responsibility for coordination with existing facilities, if any. The construction contractor has responsibility for management of subcontractors, and is expected to follow through to the specified completion date. However, construction cannot begin until all design and contract documents are complete.

Multiple prime construction contracts may be awarded for different portions of the project, such as site work, concrete, structures, mechanical or electrical work. This is required by State law in some States. It may provide additional competition and it may be set up to match the sequence of construction work. In addition, since each prime construction contractor is only responsible for its own portion of the work, the municipality has much greater responsibility for overall project coordination. Special contract clauses are needed outlining limits of liability and responsibilities of the various parties. If one construction contractor delays others, overall completion time may be affected. For this reason, the more detailed Critical Path Method (CPM) of project scheduling may be needed for multiple prime contracts. They work best where individual construction contractors are working on different sites and have little impact on each other.

Equipment prepurchase involves purchase of major equipment before a general construction contract is awarded. It requires some special grant-related actions which the project manager needs to discuss with the reviewing agency, and may not be done until either the grant or prior approval is received. Prepurchase allows specially manufactured equipment with long lead times to be started early so construction delays are minimized. Warranties may be a problem, as is the need for storage and insurance. This option may be used in conjunction with the other construction contracting methods discussed above.

[40 CFR 33.405]

Preparing Bid Documents for Construction Contracts

EPA procurement regulations require that the bidding documents include the following:

- A copy of EPA regulations 40 CFR 33.295 (subagreements awarded by a contractor); 40 CFR Part 33, Subparts F (subagreement provisions) and G (protests); and if appropriate, *"Labor Standard Provisions for Federally Assisted Contracts"*(EPA Form 5720-A).

- A complete statement of the work to be performed, including where appropriate, design drawings, specifications, and the requirement for a performance schedule.
- The terms and conditions of the contract to be awarded, including payment, delivery schedules, point of delivery, and acceptance criteria.
- The place and deadline for submitting bids.
- A clear explanation of the bidding procedures and the method to be used by the municipality to evaluate bid prices and to award the contract.
- The criteria to be used in evaluating bidders' compliance with the responsibility requirements.
- Any minority, women's or labor surplus area requirements (40 CFR 33.240).
- The prevailing wage rate determination under the Davis-Bacon Act, on each subagreement exceeding $2,000 (40 CFR 30.603(a)).

When the formal advertising method (i.e., competitive bidding) is used, an advertisement for bids is required to give adequate notice, generally not less than 30 days, to the public. Information in the public notice must tell bidders where to obtain or review bidding documents. Including a list of the supporting documents which will be required from the low bidder will expedite subsequent award of the contract.

[40 CFR 33.420]

Procedures for Receiving and Reviewing Bids

Before bid opening, the project manager may have issued addenda to correct errors, to clarify information in the bidding documents, or to incorporate the current wage rate determination. Copies should be delivered to all bidders and contract proposal documents should include a form for certification that the bidder has received all addenda before the bid date. The project manager should ensure that receipt of such addenda is acknowledged by each bidder.

Procedures for handling bids should include opening all bids at the same time and rejecting immediately those that are not responsive. Bid forms must be completely and properly filled out, dated and signed and a bid bond or deposit attached.

The project manager should log all bids, including date and time received. At the bid opening, the project manager should have the technical advisor read all bids including alternatives, tabulate bids and determine responsiveness to the conditions in the request for bids including any required bid security, check all bids for correctness of arithmetic and subsequently provide a tabulation of bids and recommendation on award of the contract. In case only one bid is submitted, advice should be sought from the reviewing agency and legal advisor, before bid opening if possible. If it is decided to return the bid and start the process again, it is advisable to return it unopened because publication of the bid price may make obtaining subsequent bids more difficult and upset the competitive bidding process.

Award of the Construction Contract

The contract must be awarded to the lowest responsive and responsible bidder, except that award cannot be made to a contractor who appears on EPA's list of suspended and debarred contractors. The award must be based on the method of bidding, evaluating bid prices and awarding the construction contract described in the contract documents.

[40 CFR 33.430]

Small Purchases

Small purchase procedures are acceptable if the cost will be less than $10,000 and applicable EPA small purchase regulations must be followed.

[40 CFR 33.305]

Force Account

If municipal personnel or equipment are to be used to perform eligible project work under force account (engineering or project inspection), approval must be obtained from the reviewing agency and work-hours and expenditures documented carefully. A force account is a financial record in which the cost of labor, materials and overhead provided by the municipality and chargeable to the project are accounted for. If documentation is not adequate or authorization has not been obtained, costs may be disallowed at audit. Force account work must be more economical or necessitated by emergency and it must be shown that municipal personnel have the necessary competence to do the work. Prior written approval is required if total costs will exceed $25,000.

Force account documentation requirements include: Hourly time records signed by both employee and supervisor; description, location and type of work performed; materials, equipment, and items purchased for work; and municipally owned equipment (type, size, time used, standby time, hourly costs based on actual cost). Time records should consist of a daily log and should identify all time worked, not just eligible time. Estimates of percentages must not be used.

[40 CFR 30.520]

Documenting Procurement Actions

Regardless of the method used, the following actions related to procurement on an EPA grant project must be documented:

- The basis for contractor selection.
- Justification for procurement method selection.
- Strong reasons for use of any specification that does not provide for maximum free and open competition and reviewing agency prior approval.
- Justification for the type of contract.
- Basis for contract price, including cost analysis and negotiations.
- Justification and reviewing agency prior approval for rejection of bids.

Municipal Coordination

The project manager should inform all departments (police, fire, public works) in the municipality, local utilities and the State Department of Transportation of the plans and schedule for the project and advise them that the costruction contractor will have responsibility for permits and coordination of construction. This will help prevent construction delays and disruption of services, such as turning off water and detouring traffic. The project manager should also work out continuity of operations with the chief plant operator if the project is at an existing plant, and be sure that there are necessary services at the project site, such as power supply, field office, storage areas and trash collection.

Records

The project manager should plan and implement the recordkeeping and filing system before construction begins, stress its importance to the management team, and back up this philosophy by centralizing the system and controlling access to the central files. This is to improve monitoring of project progress, minimize delays in project completion and cost over-runs, expedite project audits and minimize the amount of project costs that may be determined ineligible because of lack of documentation.

Circulation of records should be kept to a minimum. If project staff members need to retain certain records, they should be provided with working copies of those documents. Copies of documents that are traditionally kept in the files of the technical advisor or legal advisor should be kept in the central system.

Two main objectives of a good recordkeeping system are documentation and organization. Documentation means having written accounts of all transactions, meetings, negotiations, procurements, agreements, construction activities and telephone conversations. The complexity of the project files will be determined by the size of the project, but for all projects should contain information on at least the following topics:

Grant Information

Project Handbook and Staffing Information
Correspondence File and Log
Grant Request/Application
State Priority Certificate
Grant Offer/Agreement/Amendment
Plan of Action for the Project Manager
CoE Grant Monitoring Reports
Internal Memoranda of Management Team

Financial Records

Written Narrative of Accounting System
Source of Financing
Project Procurement Procedures in Force
Certificate of Local Financing
Outlay Projections
Cash Flow Plan
Reimbursement Requests and Log
Invoices (Engineering, inspection, other)
Professional Services Agreements
Contractor's Pay Estimates
Force Account Payroll Records
Administrative Expenses
Approval Warrants
Cancelled Checks
Periodic Audit Reports
Personal Property Inventory

Engineering

Correspondence File and Log
Engineering Agreements/Amendments/Subagreements
Procurement Procedures Used in Selection
Telephone Log
Approved Shop Drawings

Construction

Correspondence File and Log
Telephone Log
Bidding Information
Approved Plans and Specifications
Addendums
Bid Bond
Performance Bond
Notice of Award
Notice to Proceed
Contract Agreements (each contractor)
List of Subcontracts
Right-of-Way Easements
Construction Permits
Change Orders File and Log
Claims Log
Resident Inspection Reports
Deficiency Log
Material Certifications and Test Reports
Construction Progress Schedule
Lien Waivers
MBE/WBE Contracts and Status Reports
Certified Payrolls and Labor Interviews
Submittal Register and Approved Shop Drawings
As-Built Notes and Marked-up Plans
Photographs

EPA Milestone Requirements

Facilities Plan and NEPA Requirements
State NPDES Permit
Preliminary and Final Plan of Operation
User Charge System/Sewer Use Ordinance
Operation and Maintenance Manual
Chief Operator's Employment Agreement
Sludge Disposal Permit
Flood and Other Insurance Policies

Grant Close-Out

Correspondence File and Log
Final Inspection Reports and Follow-Up Memos
Project Performance Certification
Final Invoice Summaries-Construction/Engineering/Administration

An organized filing system should be complete, logically constructed, well indexed, readily accessible and safeguarded. It should be protected from fire, theft, and other potential damage.

An organized approach to recordkeeping is based on the following guidelines:

- Separating the grant files from or clearly identifying them in the municipal files.
- Organizing records on a grant and subject basis, and labeling files clearly with descriptive titles.
- Documenting every financial transaction made during the project.
- Keeping a correspondence log, preferably in chronological order, which records and keeps track of every piece of correspondence coming in and going out of the project manager's office. The log entries should include an indication of whether the correspondence is incoming or outgoing, a chronological serial number, who it was sent to or received from, the subject of the correspondence, and the file location assigned to it.
- Creating a master index that provides three different points of reference to each document: the file folder name or number, a brief description that clearly identifies the main subject of the document and a chronological serial number.
- Avoiding the temptation to frequently create new file topics after the file system is created.

There are many commercially available recordkeeping packages in book and computer software form. The reviewing agency can also make recommendations.

[40 CFR 30.500]

Accounting and Financial Control

The purpose of a financial management system is for the accountability and control of all project funds, property, and other assets, and to ensure and document that all grant funds and assets are used solely for their authorized purpose. The following are some commonly accepted minimum standards for an adequate accounting system:

- The accounting system must identify all project costs and differentiate between eligible and ineligible, allowable and unallowable, and direct and indirect costs. The purpose for which each disbursement was made should be recorded and cross-referenced.
- Recording of transactions pertaining to the construction project should be all-inclusive, timely, verifiable, and supported by source documentation.
- The accounting system should be on a double entry basis with a general ledger in which all transactions are recorded in detail, with summary from subsidiary accounts.
- The system must show the receipt and use of all EPA funds received in support of the project as well as identification of matching funds. This includes purchases of goods and services as administrative costs.

Minimum standards for financial control procedures, which use the project accounting records as a basis, are as follows:

- The project manager should have responsibility for use of project funds. There should also be an adequate separation of responsibilities such that no one person controls all phases of a transaction involving expenditure of funds. For example, an administrative assistant could oversee and approve payment vouchers with the project manager being the only one allowed to actually sign checks.
- Responsibility for accounting and control must be kept separate from project operations. The accounting system and related procedures should be described in writing for consistent application.
- Accounts should be set up to identify each organizational unit, function or task providing services to the construction project. This will provide basic data for developing and monitoring indirect cost allocations.
- A method of comparing budgeted against actual costs by task, schedule and performing organization should be incorporated into the system. This should be done monthly to allow the project manager to better understand fiscal trends, which will assist in financial planning decisions.
- Financial reports should be prepared monthly and annually to provide the project manager with a timely and accurate status of the construction project costs incurred. Such reports should be reconcilable to the basic accounting records.
- There should be a periodic reconciliation between the grant accounting records, claims for reimbursement, and the general ledger.
- Inventories of non-expendable property and equipment (other than land and buildings) should be maintained in subsidiary records controlled by the general ledger and should be verified by physical inventory at least biannually. Each item should be identified by a description, serial or identification number, source, owner, purchase date and cost, Federal share of purchase cost, location, use, condition and date the information was recorded.

These standards can be met by actively maintaining the following basic accounting documents:

- A cash receipts journal for recording and identification of the source of all monies received.
- A cash disbursements journal for recording and identifying all checks and expenditures.
- Journals for payroll and purchases.
- A general ledger as the central document in an accounting system. In a small project, the general ledger will probably meet accounting needs.
- Subsidiary ledgers for larger projects. Examples of subsidiary ledgers include accounts receivable, accounts payable and non-expendable property.

The financial advisor on the management team should set up the appropriate account titles. Further information on accounting and financial control can be found in the EPA publication, *Accounting Guide for Construction Grants October 1977.*

[40 CFR 30.200, 30.301(a)(6), 30.510, 30.530, 30.531, 30.800]

Cash Flow

The purpose of developing a cash flow projection is to determine that there will be sufficient funds available throughout the project to meet all obligations. To do this, the financial advisor should first identify, estimate and chart the timing of project expenditures. These include professional services for construction project management (estimates can be obtained from potential sources of those services); construction (estimates should be obtained from the project designer); legal, administrative, and accounting functions (needs and costs should be reviewed with appropriate municipal departments); contingencies (based on the total estimated project cost to cover potential change orders, cost overruns and unforeseen expenditures).

Next, the financial advisor should estimate and chart the timing of anticipated receipts from project financing and reimbursements from EPA for the Federal share of eligible expenses. The final local share costs consist of the portion of allowable costs above the EPA grant percentage and all unallowable costs.

Because of the contractor payment and grant reimbursement cycle, the amount of funds needed generally peaks around the middle of the project and will often be greater at that point than the final local share. If there are delays at project close-out, this may result in EPA reimbursement delays until the problems are resolved Thus, the financial advisor should consider adding a contingency to the amount of local share to cover the peak cash flow needs.

Then, the financial advisor should assess the need for project funding, determine how much of it is long-term financing and the source of short-term and interim funds.

Long-term financing may come from grants or loans from other Federal agencies, such as the Farmers Home Administration (FmHA). Some States have grants programs, make low-interest loans, or have a mechanism such as a bond bank or State revolving fund. In addition, the municipality may be able to issue local bonds for long-term financing.

To meet short-term cash flow needs, the financial advisor may consider revenue anticipation notes or obtain bank loans based on expected grant or bond issue funds. These are called grant anticipation notes (GANs) or bond anticipation notes (BANs). An advantage of such interim financing is that long-term financing is deferred until

final project costs are known and until revenue from the use of the new facilities starts to be received. Another advantage is potentially lower short-term interest rates. However, a disadvantage is that financial difficulties can result if delays are encountered in long-term financing.

The financial advisor may also consider whether to use interim financing if interest rates are unfavorable for long-term financing and if it appears that the market will be more favorable in the future or not use it if the opposite conditions exist. The financing decision for the project may also be affected by the rate structure or if the project is constructed in multi-year segments with a series of EPA grants.

[40 CFR 30.307, 30.400, 30.410]

Permits

The technical advisor should develop a checklist of permits and indicate whether the municipality or the construction contractor is responsible for obtaining them, establish target dates, and track progress in obtaining them. Additional costs due to delays in obtaining permits will generally not be eligible for EPA grant reimbursement.

Federal permits include, as necessary, those for disposal of dredged or fill material from the Corps of Engineers, discharge of treated wastewater under the National Pollutant Discharge Elimination System (NPDES) from EPA, and hazardous waste disposal under the Resource Conservation and Recovery Act (RCRA) from EPA, or which may be handled at the State level.

The necessary permits and permitting agencies differ in every State. Examples of State permits include State Health Department approval, State highway opening, public service agency for setting rates, and possibly additional State requirements for effluent discharge and sludge handling or disposal.

Local permits may include local health department approval, building, road opening, blasting and permission to cross utilities.

Private utilities owners and railroads may want to review plans to see if the proposed method of crossing meets their criteria. Railroad right-of-way crossing permits generally require very long lead times. Railroads may also require a bond or insurance and sometimes require use of their own work forces or inspectors.

Bonding and Insurance

The reviewing agency will accept the municipality's bonding requirements for construction contracts greater than $100,000, if it determines that they adequately protect the Federal interest. Otherwise minimum bonding requirements are a bid guarantee equivalent to five percent of the bid price and performance and payment bonds for one hundred percent of the contract price.

EPA regulations give the municipality responsibility for setting requirements for construction contracts equal to or less than $100,000.

A bid guarantee, which is a firm commitment such as a bid bond, certified check or other negotiable instrument, is to be submitted by each bidder as assurance that the bidder will, upon acceptance of the bid, execute such contracts as may be required within the time specified.

Performance and payment bonds are to be provided by the selected construction contractor to secure fulfillment of all its obligations under the contract The performance bond gives the municipality a means to insure project completion in the event of construction contractor default. However, the method of completing the work under a defaulted contract must be left to the bonding company. The payment bond ensures that all persons supplying labor and materials are paid as required by law in order to avoid a lien on the project. This is particularly useful in cases of construction contractor or subcontractor bankruptcy.

The technical advisor should make sure that these provisions are included in the bidding and contract documents. In all cases, required bonds must be obtained by the bidders or construction contractor from companies holding certificates of authority as acceptable sureties

Flood insurance on insurable structures is a Federal requirement when a project is located in a flood hazard area as defined by the Flood Disaster Protection Act of 1973 and as discussed in EPA regulations. Flood insurance is available under a program of the Federal Emergency Management Agency (FEMA).

In addition, the financial advisor needs to consider property and liability insurance and other insurance needs as required by State law. The municipality should require the construction contractor to carry insurance to protect against fire, theft, and other perils during construction. The municipality may need insurance during construction, as well, depending on what the contractor policy covers and excludes. The financial advisor can seek advice from an insurance agency that specializes in owner's protective insurance. If the municipality is self-insured, the financial advisor should review the project needs and discuss with the legal advisor whether any additional purchased insurance is needed for adequate coverage.

[31 CFR 223; 40 CFR 33.265]

Worksites

The legal advisor should acquire the treatment plant construction site, the sites for sewer lines, the rights to cross roads and railroads, temporary working easements and land for sludge disposal with as much lead time as possible. The location of each parcel of land to be acquired will be determined during design.

If worksites are not available by the time they are needed for construction work, the resulting delays can cause increased costs which are generally not allowable for grant participation. If acquisition of potentially grant eligible land must begin before grant award, prior approval from the reviewing agency should be requested.

There are several ways to acquire the land needed for construction including purchasing land outright, obtaining a purchased or donated easement, obtaining rights to the land permanently or for the period during which it is needed, or leasing the land.

The reviewing agency can advise about eligibility, appraisal and acquisition requirements. Land acquisition requirements for EPA funded projects, regardless of whether the land is eligible, are found in EPA regulations and in *Uniform Appraisal Standards for Federal Land Acquisition, (GPO#052-059-000-20)*. These explain the need for supporting documentation, including an appraisal and records of negotiation or condemnation proceedings.

[40 CFR 35.2210]

Managing the Project During Construction

During construction, the project manager should use the project management team to assure that the project is constructed in accordance with the approved construction drawings and specifications, approved addenda, change orders, the NPDES permit and grant conditions. EPA grantee experience indicates that the following areas are those which have had the greatest need for project management attention once construction is underway:

Project Communications

The project manager should maintain communications such as weekly coordination meetings as well as the routine written and oral communications required to manage a construction contract. Regular on-site weekly meetings between the technical advisor or resident engineer and the construction contractors are recommended to deal with actual progress in the previous week as summarized from inspectors' daily inspection reports and expected activity for the following week. The progress schedule should be discussed to analyze problems and get the project back on track. However, measures for meeting the contract completion date should remain the responsibility of the construction contractor. If any work has been rejected, there should be agreement on what must be done. The status of proposed and potential changes may be reviewed so that everyone agrees on the actions to be taken. Provisions for special events such as holidays, tie-ins to existing systems and tours of the project can be made in the weekly meeting. A memorandum summarizing the meeting should be distributed to all participants and the project manager.

There should also be a monthly management meeting between the project manager, technical advisor and resident engineer to review progress. Prior to the meetings, the project manager should require either the technical advisor or construction manager to prepare a monthly report summarizing the status of project costs, schedule and contract administration items such as change orders and payments, potential problems and recommended preventive or corrective actions. This monthly report should summarize the information from the on-site weekly meetings.

Much of the written communication during construction concerns questions about plans and specifications. Each question and answer should be put in writing and a copy forwarded to the project manager. The use of a break-apart carbon form for questions and answers has saved typing and filing time on many projects. The administrative support staff would be responsible for tracking, cross-referencing and filing them after review by the project manager They should be tracked until they are resolved or become change order proposals.

The project manager may use standard distribution lists for routing of correspondence, reports and written communications. Some recipients may only need to be sent, for example, weekly reports and change order proposals which will save unnecessary reading and filing.

Preconstruction Conference

The preconstruction conference is held after contract award and prior to the beginning of construction. This is the first meeting which will be attended by everyone involved in the construction of the project except the reviewing agency. Another preconstruction conference should also be arranged with the Equal Employment Opportunity Office (EEO) of the U.S. Department of Labor, generally where building costs exceed $1 million, to ensure that contractors understand and comply with the Federal EEO requirements.

Attendees should include the project manager, construction manager if used, members of the project management team, field personnel, all construction contractors, appropriate municipal officers and representatives from public and private utilities. Major subcontractors may be included at the option of the construction contractors.

The purpose of the preconstruction conference is for the municipality, the project management team and the construction contractors to coordinate schedules, review regulatory requirements, resolve questions, and set the ground rules for working together during construction.

The project manager should have a checklist of items to discuss at the preconstruction conference. Listed below are some suggested topics for the checklist:

- Organization, responsibilities and authority of each participant.
- Communications and contact points between all participants.
- Overall project and detailed construction contractors' schedules and coordination between construction contractors.
- Questions on plans, specifications and contract documents.
- Payment requests from construction contractors' forms, timing, methods of establishing quantities, documentation, retainage.
- Change order requests, documentation, approval levels.
- Minimum wage and posting of wage rate determination.
- Compliance with local, State and Federal laws on such topics as occupational safety, equal employment opportunity, minority and women owned enterprises, and small business.
- Worksite topics such as earthwork locations and removal, storage areas, inspection and testing procedures, responsibility for layout and staking, traffic control and signs, environmental protection, worker and public safety, fire and blasting protection, coordination with utilities, ar. 1 cleanup.

[40 CFR 30.603]

Project and Contract Schedules

The technical advisor should prepare an overall project schedule. Lead times and deadlines should be reasonable and construction methods and procedures should not be influenced or dictated with unnecessary schedule constraints. The contract documents should make the construction contractors responsible for developing and updating contract schedules for construction and for meeting the time for completion established in the overall project schedule. Each contract schedule should be delivered shortly after the construction contract is signed.

The project manager, with advice from the technical advisor or construction manager, must decide whether to require a Critical Path Method (CPM) schedule, a bar chart or other type of schedule in the contract documents. As a rule of thumb, contracts with over 25 activities will benefit from the more detailed schedule control provided by a CPM schedule. Any activity over 15 days duration should generally be broken down into subactivities.

The CPM is a system where all the construction operations which have to be done in sequence are shown on a line diagram. The diagram shows the sequence and length of time it takes to complete each operation by representing each operation with an arrow. By tracing along the various paths of the series of arrows, the construction contractor can determine which path establishes the minimum time to complete the work. That path is called the critical path and changes in the timing of operations along it normally affect the time of completion.

A bar chart will show a few major activities more clearly, but not show the relationship between various activities. It is not unusual to use a bar chart for the overall project schedule of key events included in the grant application, yet require CPM contract schedules. When more than one construction contractor is on a site or coordination is required to maintain the operation of existing facilities, an overall project CPM schedule is strongly advised. If either a project or contract schedule is too complex for the people expected to use it, it will not be effective and project scheduling will not be under control.

For projects where a contract CPM schedule will be required, the following are minimum requirements:

- The schedule must meet any intermediate milestone dates and the time for completion of the overall project schedule as given in the specifications.
- The schedule should include all submittals defined in the specifications.
- Receipt and the installation of specialized equipment should be clear in the schedule.
- The schedule must identify the critical path to allow evaluation of a claim for delay on a noncritical activity or assessment of the need to accelerate construction in order to meet deadlines.

Many commercial CPM analysis systems and scheduling specialists are available. The technical advisor or construction manager will probably have CPM capabilities available.

Monitoring Construction Progress

Schedules are effective management tools only if they are regularly monitored and updated through field personnel to reflect necessary changes. Cost and time of work remaining should be compared with the contract funds balance and time remaining.

Updates and revisions should be made from records of construction progress and inspections which also provide communication checks among field personnel, information needed to resolve disputes quickly and support of construction change orders and the final EPA audit. Therefore, inspector's diaries and daily reports should be stored securely, either on the job site or in the technical advisor's office.

Documentation should include inspector's diaries, daily reports, and photographs of the job site. Particular attention should be given to changed conditions. The daily report should contain the items listed under DUTIES AND RESPONSIBILITIES OF THE PARTICIPANTS. Photographs, including those of deficient work, are among the most helpful ways of establishing job progress on a routine basis and should be used to supplement inspectors daily reports. Descriptions and dates should be written on the prints and they should be securely filed.

Enforcing the Construction Progress Schedule

The construction contractor should be given every opportunity to keep the project on schedule, while maintaining the specified quality and cost of the work. However, if relations with the construction contractor break down completely to the point of default, the project manager should discuss the problem with the legal advisor and promptly contact the bonding company, which then can determine whether to replace the construction contractor or take other actions. Failure to put the bonding company on notice and exercise the schedule enforcement, default and remedies clauses exactly as in the construction contractor's contract may result in loss of the municipality's avenues of legal recourse and ability to recover any funds or finish the project within budget.

As a practical matter, the construction progress schedule should be enforced as effectively as possible by frequent and meaningful communications and decision-making, prompt payment for work in place and increased retainage for unsatisfactory progress.

[40 CFR 30.301(a)(2), 30.306, 35.2005, 35.2212]

Contract Administration

Management of Construction Contractor Payments and Requests for Reimbursement

Prompt payments to construction contractors are necessary and often required by provisions in the contract documents. While several States have laws or are considering legislation that requires payment of interest penalties to construction contractors for late payment of legitimate invoices, Federal law prohibits the use of grant funds for such interest payments. Thus, the project manager should expedite construction contractor payments.

Use of proper payment procedures should motivate construction contractors to finish tasks on time while minimizing capital requirements. The municipality should not overpay a construction contractor in order to avoid the possibility of being unable to recover overpayments in the event of construction contractor default.

Contract documents should describe the procedures and timing for processing construction contractor payment requests. The contract documents should also describe the municipality's retainage policy for processing construction contractor

payment requests, which must be in accordance with State law. If the construction contractor is making satisfactory progress and there is no other specific reason for withholding a portion of the progress payments, retainage should only be that amount necessary to assure completion of the project. While EPA regulations no longer specifically address retainage, EPA will only pay the Federal share of allowable costs which are currently due and payable by the municipality, which means deducting any retainage held against the construction contractor. EPA regulations prior to March 28, 1983, limited the amount of retainage to 10 percent of cumulative payments up to 50 percent project completion, and reduction to 5 percent until substantial completion unless there were specific reasons justifying a greater percentage of retention. At that time, all retainage would be paid except that amount specifically required to ensure completion of the contract. As with late payments, some States may require payment of interest on retainage held out from payments to construction contractors.

One common method of determining the amount of each partial payment to the construction contractor is a contract breakdown by subcontracts and equipment suppliers, by trades, or any other convenient division. The resident engineer or technical advisor and the construction contractor's superintendent then agree on a percentage complete for each line item in the breakdown each month and from this an estimate of value in place is calculated. Another method involves estimating the quantities of equipment and materials that are in place at the end of each month. For unit price contracts, the estimated quantities multiplied by the unit prices in the bid schedule will determine the progress payment. For a lump sum contract, the project manager and construction contractor must initially agree on a set of unit prices to be used for equipment and materials. Still another method is to agree on values for the individual activities in a detailed construction schedule. Payment is then based on the percentage completed of each activity each month.

If interim payment is being made in accordance with the contract documents for equipment being specifically fabricated for the project, the project manager should arrange for inspection of the equipment while it is in the manufacturing plant. To protect against default by the supplier, a performance bond adapted to this situation is recommended.

Whatever the method used in establishing the value of partial payments to the construction contractor, it should be established at the start of the project. For any method the payment request should include the following:

- Required appropriate breakdowns of the contract into project items.
- Required invoices from the supplier or manufacturer with cost of the item shown for stored materials.
- Records of stored items previously paid with installation date and balance of items to be installed.
- List of approved change orders with amounts.
- Field quantity calculation worksheets.
- Update of the contract progress schedule.

The resident engineer or technical advisor should provide a separate verification of work in place.

The technical and financial advisors should establish a time of the month to determine value of work in place and a processing sequence that results in prompt payment to the construction contractor, taking the disbursing patterns of the municipality into consideration. Many municipalities are limited by the timing of governing board meetings to approve disbursements, or by prearranged accounting cycles. The request for payment should be timed so that it can be reviewed, processed, and disbursed in the shortest possible time.

The system should also assure that the financial advisor is given prompt notice of variance from anticipated payments to construction contractors and others so that cash flow projections can be updated. While procedures for submitting interim payment requests (EPA Form 271, Outlay Report and Request for Reimbursement for Construction Programs) vary from State to State, the following is some of the supporting documentation that may be required to accompany requests for reimbursement:

- Invoices for services.
- Construction contractor's payment request.
- Separation of eligible from ineligible and innovative/alternative (which are eligible for reimbursement at a different Federal share) from conventional project items.
- Change orders approved by the reviewing agency.
- Authorization of request for reimbursement.

[40 CFR 30.400, 33.280]

Processing Change Orders

A change order is a written document which is issued to a construction contractor in order to alter the price, time of completion, or any other requirement of the original contract documents, as long as it does not increase the scope of work of the contract. Change orders may originate from the construction contractor as a proposal or claim, or may be initiated by the municipality. Since it may alter the competitively established price of a contract awarded to a low bidder, change order negotiations need to be conducted in a manner which will preserve the benefits of the original low-bid price. If the change is within the scope of the project, but outside the scope of work of existing contracts on the project, it may be necessary to procure the work required by the change as a separate contract through formal advertising.

The municipality must formally agree to any change in the conditions of the construction contract. The project manager should:

- Determine whether a change order is warranted.
- Negotiate a fair and reasonable price and time extension for required changes, or authorize the technical advisor to do so.
- Maintain cost basis records for the change, including records of negotiation.
- Maintain current and accurate fiscal projections of contract and project completion costs.
- Resolve disputes which may have arisen as a result of a proposal for a change.
- Notify the reviewing agency in writing of events or proposed changes that require a grant amendment.

The project manager should require the technical advisor to:

- Provide an opinion on whether a change is needed and, if so, why.
- Prepare a fair and reasonable independent cost and time estimate on the proposed change to verify that the cost and time extension estimate prepared by the construction contractor is fair and reasonable.
- Negotiate change orders if authorized.

The project manager should require the construction contractor to:

- Provide and certify cost and time extension data needed for review of their necessity and reasonableness and of the eligibility and allowability of costs proposed.
- Submit change order proposals within the time allowed by the contract and enter into meaningful negotiations on a necessary contract change.
- Comply with EPA recordkeeping and accounting requirements for change orders.

If a change order will significantly affect project performance or costs, written approval should be obtained from the reviewing agency before work is started on the change. To minimize construction contractor delays, advance notice should be given to the reviewing agency for prior approvals.

The municipality is financially responsible for any non-Federal share of the costs added as the result of a change. Furthermore, the reviewing agency will make a detailed review of each change order and if it determines that a change order cost is not allowable for EPA participation, the entire change order cost would be considered non-Federal costs.

Additional information on change orders can be found in the EPA publication, *Management of Construction Change Orders, A Guide for Grantees, March 1983.*

[40 CFR 30.700, 35.2204]

Management of Claims

A claim is a construction contractor's request for relief, alleging that the municipality's action, inaction or misrepresentation in the contract documents has caused an involuntary change in the cost or time of performing the contract.

Techniques that can help the project manager to minimize the occurrence and effect of claims can be found in the EPA publication *Claims Management Guidance, March 1985.* Some of these are to:

- Closely monitor the construction project in order to anticipate problems and be prepared to resolve them as quickly as they arise.
- Make a fully adequate subsurface investigation and include the results in the bidding documents.
- Ensure that the plans and specifications are biddable and suitable for construction, that all conflicting language has been removed and that ambiguities have been clarified before advertising for bids.
- Specify an adequate construction schedule for the complexity of the project.
- Periodically review the construction schedule, enforce its provisions and revise it by change order whenever circumstances justify extension of the schedule dates.

If a claim is filed, the project manager should address the issues raised and control the future costs of the claim by having the technical and legal advisors analyze each issue. Then, a fair and equitable settlement of the meritorious portions of the claim, if any, should be negotiated.

Claim assessment and negotiation costs may be eligible for grant assistance if prior approval by grant amendment is received from the reviewing agency. Technical or legal assistance from the reviewing agency is generally given only after all possible sources of assistance at the municipal level have been explored.

[40 CFR 30.700, 35.2204]

General Construction Management Activities

Coordination of Utilities

The project manager should make sure that all utility needs during the construction process and for operation of the project are planned for, coordinated with local utilities and in accordance with any applicable State laws. Rights of way necessary to install water, gas and electric lines for temporary service during construction and for any permanent hook-ups or substations needed for operation should be obtained and arrangements made to secure these services from utilities in the time frame necessary to meet the project schedule. Responsibility for installation and payment for temporary utilities is generally given to the construction contractor in the contract documents.

Traffic Control

The project manager should make sure that the construction contractor has arranged with local and State authorities for detours or traffic restrictions because of construction in public roads, designation of truck routes through populated areas to minimize impacts, and general control of entrances to and exits from construction areas. Traffic police may need to be assigned accordingly and a traffic control plan approved before any construction begins.

Safety Considerations

The project manager should ensure that contract documents require construction contractor compliance with local, State, and Federal (OSHA) safety requirements. Contract documents should also require that the construction contractor have a contingency plan for handling on-site injuries if they do occur and post emergency numbers and directions to a hospital. The field personnel should include in its reports all instances where the construction contractor has been notified that an unsafe condition is detected by anyone and any corrective actions taken.

Site Security

The project manager also needs to plan in advance to guard against potential public safety hazards. This includes ensuring that the construction contractor erects fencing at the site, institutes site security and visitor precautions, and safely stores chemicals and explosives, all of which should be in the contract documents.

Conferences with the Reviewing Agency

During the construction process, the following conferences, inspections and evaluations will be conducted by the reviewing agency to assure that the project is being managed effectively and being built in accordance with the plans and specifications.

Project Management Conference

The Project Management Conference (PMC) by the reviewing agency should preferably be scheduled before the preconstruction conference since many of the PMC topics will be discussed at the preconstruction conference. The purpose is to provide the project manager and management team with detailed guidance for overseeing and managing the construction project.

The PMC begins in the municipality with a briefing by the reviewing agency representative for the project manager, members of the management team and appropriate members of the field staff. The main points to be covered are:

- Project management including management and processing of change orders and claims, processing of payment requests, maintenance of adequate records for subsequent audit, schedule for sewer system rehabilitation if necessary, adoption of a sewer use ordinance and implementation of a user charge system before the treatment works is placed in operation, development and implementation of the final plan of operation.
- Grant management including regulatory requirements for procurement procedures and property control, special grant conditions, recordkeeping, project performance certification and project closeout procedures, EPA and State audit requirements.
- Construction management activities including the technical advisor's responsibilities and authority, resident engineering and inspection activities, ensuring conformance with the approved plans and specifications, daily reports, materials testing and ensuring adherence to the construction schedule.

Interim Inspections

Scheduled interim inspections are conducted by the reviewing agency to ensure that the project management team and the construction contractor are fulfilling their respective responsibilities. The frequency of interim inspections is determined by the size and complexity of the project, the rate of progress being achieved, and the nature of problems or issues arising during construction. A project may be inspected as often as monthly, but where a project is progressing well and there is a demonstrated high level of project management capability, inspections may be bimonthly or quarterly. On extremely large or complicated projects, more frequent inspections can be expected.

Regular interim inspections also provide the reviewing agency with an opportunity to focus on one specific area at a time such as fiscal records, project files, procurement, or management of claims and change orders. Using this approach, all significant aspects of grant management would be covered over the life of the project. Where necessary, unannounced interim inspections may also be conducted, based on the findings of earlier inspections or other information brought to the attention of the reviewing agency.

Principal areas of focus during interim inspections typically include grant management and recordkeeping, compliance with grant and permit conditions, contract administration including claims and change order management, Labor Standards and MBE/WBE compliance, construction progress and schedule, construction quantity and quality, and implementation of the plan of operation including preparation of the Operation and Maintenance manual.

Construction Management Evaluations

A Construction Management Evaluation (CME) is a comprehensive on-site review of selected projects by the reviewing agency. It covers the entire project, including all phases of the project management team's responsibilities and performance. It is a more formalized procedure than an interim inspection, and differs primarily in the depth, duration, and purpose of the review.

The objective of the CME is to evaluate project management procedures, and through this process gain insight into overall management of the EPA construction grants program. Typical areas of review include:

- Grant Management, including adherence to grant requirements, procurement requirements, and the adequacy of accounting and recordkeeping systems.
- Construction Management, including the adequacy of inspection reports, materials testing and certificates, shop drawings, record drawings, and progress payment procedures, as well as the handling of claims, change orders, correspondence, labor requirements, and other organizational requirements.

At the conclusion of the CME, the reviewing agency presents an exit briefing and prepares a formal report. Of particular importance are the action items which may include actions that need to be taken by the project manager to correct deficiencies and actions to be undertaken by the reviewing agency to assist in the successful completion and audit of the project.

Preparing to Operate the Facility and Closing out Construction

Releasing the Construction Contractor

As the final step before the construction contractor is released, the project manager should conduct a final walk-through with the technical advisor, resident engineer and chief facility operator to assure that all work has been completed. This is done after all equipment has been tested and generally after a startup period in which equipment and processes have been test run. The project manager should have the legal advisor examine the project and contract records, and the financial advisor examine financial records pertaining to the contract. The project manager should also ensure that all work under each contract has been successfully performed by the construction contractor in accordance with the plans, specifications, and change orders which have been previously approved by the reviewing agency, and that all legal obligations including all payments to subcontractors and suppliers have been satisfactorily met.

In addition, the project manager should ensure that specified contract requirements for bonds, warranties, guarantees, and assurances have been met. Before release, copies of all warranties should be obtained from the construction contractor, legally transferred to the municipality, and filed.

[40 CFR 30.800, 33.1030(14)]

Completing the Final Inspection

The reviewing agency will conduct a project final inspection to establish to the satisfaction of EPA that construction of the project is completed in accordance with approved plans, specifications, and change orders. Final inspection may occur before or after release of the construction contractor. Specifically, the final inspection is to determine for the contract or project if all but minor components of the project such as landscaping have been completed in accordance with the approved plans, specifications, and change orders; the facility is capable of functioning as designed; all equipment is operational and performing satisfactorily; and laboratory facilities are complete and available to conduct appropriate tests.

The municipality must request this project final inspection by notifying the reviewing agency that construction is complete. The reviewing agency will, shortly after this request, schedule and conduct the inspection, usually at a mutually agreeable date. The project manager should lead the group supporting the reviewing agency's final inspection.

Generally the reviewing agency will establish a cut-off date at the time of final inspection, which may be from 30 to 60 days later to allow correction of miscelianeous items. Costs incurred after the cut-off date are not allowable except costs for startup and engineering services during the one-year certification period. Revisions to the cutoff date are the exception to the rule, so that construction should be complete before the final inspection.

If the reviewer arrives at the project site to conduct the final inspection and conditions exist that prevent it from being completed, a written statement of the deficiencies should be provided. For example, there may be unsatisfied grant conditions or lack of flow data on which to certify the project as operable. After these problems are resolved, the project manager must inform the reviewing agency of their correction so the final inspection can be rescheduled.

[40 CFR 35.2216]

Certifying Project Performance

The one-year project certification period starts when the municipality notifies the reviewing agency in writing of its intent to initiate operation of the project. At the end of the period, the authorized representative must certify to the reviewing agency whether or not it meets certain standards. Discharging projects must meet design specifications and effluent standards under design year equivalent flows and loads as well as under initial year flows and loads. Nondischarging projects such as interceptor sewers and pumping stations must meet design specifications only. Sewer rehabilitation projects must meet standards for quantity of infiltration and inflow eliminated.

In order to accomplish this, either the engineer who was responsible for design or the engineer providing technical advisory services during project construction must be selected as the prime engineer for the project certification period.

The prime engineer should be required to direct the operation of the project, including:

- Reviewing the operation of the unit processes and equipment that make up the treatment works.
- Briefing municipal officials and plant personnel on the status of the project performance program and overall project operation.
- Reviewing adequacy and appropriateness of user charges, budgets, salaries, and other financial management items to meet the short and long term needs of operating the facility.
- Providing assistance with setting up and tracking warranty files so that they are stored in an organized manner for easy retrieval.
- Reviewing personnel systems, record development, laboratory procedures, process systems, and safety and emergency systems.
- Providing training of operating personnel.
- Preparing curricula and training materials for operating personnel.
- Revising the final Operation and Maintenance manual to accommodate actual operating experience.
- Advising the authorized representative whether the project is meeting its performance standards and, if not, providing a report recommending corrective actions.

The prime engineer should keep the project manager informed of any overall management issues during the project certification period including:

- The capability and performance of operating personnel to effectively and efficiently operate and maintain the facility under normal, alternate, and emergency modes of operation.
- The capability and performance of the municipal organization to effectively accomplish necessary administrative, utility management, and financial functions.
- Actual and estimated future costs of operation and maintenance in relation to prior estimates of costs, the adequacy of revenue sources, and actual charges necessary to meet revenue requirements.

To ensure that these activities are being properly conducted, the project manager can request weekly updates from the prime engineer on the performance of all personnel and equipment, and conduct spot checks to confirm these reports. Regular staff briefings can be scheduled monthly to inform other project personnel and municipal officials of project performance.

A schedule for training sessions should be set up by the prime engineer well before the project certification period begins on at least the following topics:

- Operation and control of specific unit processes and equipment during normal and abnormal conditions.
- Flow measurement and sampling procedures.
- Laboratory procedures.
- Maintenance management systems.
- Preventive and corrective maintenance measures.
- Effective use of the Operation and Maintenance manual.
- Records management.
- Financial management.

An adequate course should completely train operating personnel early in the one-year performance period. Then, during the year, operating personnel should improve their operating skills under the direction of the prime engineer until they demonstrate that they can operate the facility on their own. This should be accomplished well before the end of the performance period.

During the one-year performance certification period, the list of supplies needed for operation and maintenance listed in the Operation and Maintenance manual should be reviewed to ensure that adequate supplies are available for routine operation of the project. Also, a competitive procurement method should be documented in the files for obtaining and assuring that adequate supplies will be available when needed. Frequently used suppliers for each required item should be listed, with appropriate telephone numbers and current prices.

[40 CFR 35.2218]

Preparing for the Final Audit

In accepting an EPA construction grant, the authorized representative has agreed to make all project-related books, documents, records, and papers accessible to the reviewing agency for audit purposes. The objective of the final audit is to determine: which claimed costs are eligible, allowable, reasonable and allocable to the project; that the project is put to its intended use; and that all applicable laws, regulations, and grant conditions have been complied with.

When the auditors arrive, they should be introduced to the project manager and appropriate administrative and financial personnel, and each person's primary responsibilities outlined. The authorized representative may wish to designate the project manager as the main point of contact for the auditors.

The auditors can be expected to review the project accounting practices including accounting records; supporting documents to verify claims; traceability of transactions; the proper segregation of costs into eligible/ineligible, allowable/allowable and direct/indirect categories; internal financial controls and accounting reports. The auditors will also review the records supporting force account claims, procurement management practices on professional and construction contracts, and project management practices for cost and schedule control. Other materials subject to review may include flood insurance, the property control system, compliance with the facility's NPDES permit and readiness to operate the facility. This includes a look at the facility's permanent record file, staffing and laboratory.

Records Needed

Preparing for the audit requires ensuring that the project records have been maintained, are up to date and are easily accessible. Project management records generally needed during the final audit include the following:

- Copies of the original grant agreement, any amendments to it and the grant application.
- Records of procurement actions.
- Records and accounts covering receipt and disbursement of project funds.
- Copies of contracts awarded for work under the project.
- Copies of periodic reports of project progress.
- Vouchers paid from project funds.
- Time and attendance records for employees paid from project funds for both administration and force account.
- Records of personal property such as equipment not included in construction contracts and charged to project funds.
- Documentation of project travel expenses.
- Copies of facility plans, user charge systems, Operation and Maintenance manuals and other documents required by EPA regulations or grant conditions.
- Copies of interim and final requests for reimbursement of grant funds.
- Project bank account statements and cancelled checks.
- Copies of plans, specifications, change orders, and record drawings.
- Copies of public notices of property acquisition programs, and records of appraisals, offers, and payments for real property interests including easements acquired for the project.
- Copies of public notices of relocation assistance programs and records supporting payments to persons displaced from their homes, businesses, or farms by the project.

[40 CFR 30.540]

Common Audit Problems

A review of EPA audit reports show that some problems recur on a great many projects. These frequently identified audit problems are:

Costs Claimed Which an Accounting System Cannot Document or Support

The most common problem is the lack of an adequate recordkeeping and financial management system which provides for accountability and control of all property, funds, and other assets. Generally, municipalities maintained records that were adequate to satisfy their own needs, but Federal requirements often exceed those needs.

Every entry in the accounting records should have been supported by appropriate documentation and in accordance with Federal and State recordkeeping and audit requirements. This might be an incoming document such as an invoice, or it could be an internally generated document such as a payroll list. In many cases, several

different documents would be necessary to support a single transaction. For example, a purchase of materials should have a purchase request, purchase order, and receiving report in addition to an invoice. It might also involve requests for proposals, contracts, governing board resolutions, progress reports, and progress payments.

The files of supporting documents should contain all information necessary to explain every transaction completely. Files should be cross-referenced in such a way that transactions can be traced from any document dealing with the transaction back to the initiation of that transaction and forward to the bookkeeping entry or entries concerned with that transaction.

All too often funds spent on the project cannot be accounted for; records are not supported by source documentation; the costs are not segregated into eligible and ineligible, allowable and unallowable categories; and requests for reimbursement are substantially overstated or understated.

Items most frequently identified were: lack of time card types of records, lack of cancelled checks, and inadequate task descriptions in contracts.

Costs Claimed in Excess of Grant or Contract Limitations

A common audit problem is engineering costs which appear to be outside the scope of the contract. Municipalities are responsible to ensure that engineers perform in accordance with the terms, conditions, and specifications of their contracts. The engineering contracts should provide that no services be furnished for which additional compensation could be charged without written authorization.

Costs Claimed Which Have Been Previously Determined Ineligible or Unallowable

Municipalities sometimes claim costs that are ineligible, unallowable, or that have been denied on previous payment requests and must be recovered at final audit.

The municipality should try to resolve adverse eligibility decisions on which there is a reasonable basis for disagreement with the reviewing authority when they arise. This will expedite the final decisions on outstanding issues before they are brought up during the final audit and delay the closeout process.

Costs Incurred After the Authorized Construction Contract Completion Date

If project records do not adequately identify the actual engineering tasks performed, the auditor may question the technical services incurred after the construction completion date including any approved time extensions as inspection services for delinquent construction activities. Project records should show whether the costs incurred were for such items as record drawings, Operation and Maintenance manual completion, change order processing, claims management or normal contract closeout procedures.

Redesign or Rework Costs

Costs for any rework are generally not allowable unless they resulted from changes in Federal requirements, since such costs are not considered necessary or reasonable. If the project was replanned or redesigned, the municipality should be prepared to document the change in Federal requirements making the rework necessary and approval from the reviewing agency for the rework.

Force Account/Administrative Expenses/Indirect Costs

Common force account audit problems are due to not having received prior written approval, having exceeded the funding limitation, and not having maintained adequate records to support the force account and administrative costs claimed. An estimate of the percentage of an employee's time spent on project work is not an adequate record for this purpose.

Reimbursement of indirect costs can be made when a provisional indirect cost rate has been approved by the reviewing agency and specifically provided for in the grant agreement. The most common indirect cost audit exceptions are due to not having received provisional approval of the indirect cost rate and not being able to substantiate the claim for indirect cost reimbursement at the time of audit. EPA regulations and guidance are available to assist in accounting for indirect costs.

Unapproved or Unallowable Change Order Costs

A common audit problem is reimbursement requested for change orders before they have been approved by the reviewing agency. The best opportunity for obtaining full allowability of change orders is by submitting them for approval as soon as executed.

Non-Compliance With Procurement Regulations

Areas of common audit problems due to procurement non-compliance are improper methods used in selecting a professional services firm, lack of procurement documentation especially regarding utilization of minority and women owned businesses, lack of contract negotiation documentation, services performed without an executed bilateral written agreement, and cost ceilings of contracts exceeded without prior written authorization and written amendment to the contract.

Appendix

Management Plan Worksheets

Grantee Name: Date Prepared:

Grant Number: Prepared By:

Project Type (Plant, Interceptors, other):

Project Description:

Eligible Cost:

Project Management

1. Project Manager:

Status of Position (Filled? Full-time?):

_____

Major Responsibilities and Duties:_____

_____

Name:_____

Type of Position (Employee, other):_____

Location (In project office, in municipal department, other and phone number):_____

_____

Construction Manager:

Status of Position (To be used?, Filled? Full-time?):

_____

Major Responsibilities and Duties:_____

_____

Name:_____

Type of Position (Employee, consultant, other):

_____

Location (In project office, in municipal department, other and phone number):_____

_____

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2. Project Management Support

Technical Advisor:

Status of Position (Retained?, Same as Designer?):

Major Responsibilities and Duties:

Name:

Type of Position (Employee, consultant, other):

Firm Name and Address (If applicable):

Work Location (In project office, in municipal department, other and phone number):

Financial Advisor:

Status of Position (Filled or Retained? Full-time?):

Major Responsibilities and Duties:

Name:

Type of Position (Employee, other):

Work Location (In project office, in municipal department, other and phone number):

Accountant:

Status of Position (Filled? Full-time?):

Major Responsibilities and Duties:

Name:_____

Status (Employee, other):_____

Work Location (In project office, in municipal department, other and phone number):_____

_____

Legal Advisor:

Status of Position (Filled or retained?, Full-time?):_____

_____

Major Responsibilities and Duties:_____

_____

Name:_____

Type of Position (Employee, on retainer, other):_____

_____

Work Location (In project office, in municipal department, other and phone number):_____

_____

Grant Administration, Contract Administration and Procurement:

Depending on project size and team organization, these duties may be delegated across the management team, as appropriate, or assigned to additional staff.

	Name	Full or Part-Time	Work Location
Grant Administration:	_____	_____	_____
Contract Administration:	_____	_____	_____
Procurement:	_____	_____	_____

3. Field Personnel

Based on the size and complexity of the project, field personnel will include (resident engineer, number of inspectors):

_____

Source:_____

Resident Engineer (full or part-time):_____

Inspectors (number, assignments, full or part-time):_____

_____

4. How will the project management team be organized?
(Attach an organizational chart including names and vacancies):

Preparing for Construction Contract Award

1. Organizing the Project Management Team

When is the organizational meeting? Who will attend?

2. Recordkeeping

Who will manage and maintain the filing system? (Name, full or part-time, work location and phone number):

What file categories will be used? (Attach copy):

How will files be indexed and cross-referenced?

What management procedures will be used to make sure that records, documents, logs, and ledgers are secure, complete, and up-to-date?

How will it be ensured that the project management team and construction contractors are maintaining their files?

3. Accounting

Who will be responsible for establishing and managing the accounting procedures? (Name, full or part-time, work location and phone number):

_____

Attach a chart of accounts:_____

4. Project Funding/Cash Flow Planning

Estimate average schedule of payments and grant reimbursements.

	Payments	Reimbursements	Net Cumulative Outlay
$/month	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

Because not all of this will be reimbursed by the grant and because grant payments will lag behind project payments, some interim financing will be needed.

Total additional amount to be financed_____

If interim financing is to be obtained from a variety of sources:

Source	Amount of Total	Date Available
_____	_____	_____
_____	_____	_____
_____	_____	_____

5. Permits

Permits that will be needed:

Federal	State	Local
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Who has the responsibility for obtaining permits necessary for this project?

_____

6. The Procurement Process
Self Certification:

If self-certification is being considered for the procurement process, what steps are being taken to ensure conformance with EPA procurement regulations?

Procuring Professional Services:

Indicate the method to be used in procuring professional services to oversee construction (competitive procurement, use of same engineer, non-competitive procurement, force account):

If using the engineer that performed planning and design, reasons for this approach:

If using non-competitive negotiation, reasons for this approach:

If using municipal employees (force account), reasons for this approach:

Securing A Construction Contractor:

Which types of construction contract are to be used? (Single contracts, multiple prime contracts, equipment prepurchase, other):

For the following reasons:

Preparing and Reviewing Bids:

Outline of the procedures established for receiving and evaluating bids from construction contractors:

7. Testing Services:

The following arrangements for testing services have been or are being made:

Type	Status

8. Bonding and Insurance

The following bonds and insurance will be required in the construction contract documents:

Contract	Contract Amount	Type/Amount of Bonds and Insurance

The following additional municipal insurance coverage will be obtained:

Type	Amount

9. Worksite Acquisition

The following worksites need to be acquired:

	Status
Plant construction site	
Railroad crossings	
Easements	
Sludge disposal sites	
Other	

Managing the Project During Construction

1. Field Oversight and Reporting

Reporting requirements to be established (reports, meetings, briefings) from:

	Type of Reporting	Frequency
Construction Manager (if applicable)		
Technical Advisor		
Resident Engineer		
Construction Contractor(s)		
Others		

Where will the main set of construction files be maintained? _____

2. Project Schedule Control

What techniques will be used for tracking progress against the construction contractors' schedules (bar chart, CPM, other) and why selected?

Who will be responsible for tracking construction progress against the construction contractors' progress schedules?

3. Management of Payments and Requests for Reimbursement

How is value in place to be estimated? (Breakdown of total contract amount at beginning of job, estimation of quantities of materials in place at the end of each month, values assigned to individual construction activities in detailed project schedules, other):

What municipal disbursement patterns must be taken into account when planning a schedule for making progress payments?

Attach a flow chart describing the timing of monthly payment schedule activities:

If retainage is to be employed, what is the basis of the policy? (State or local laws, other):

How will construction contractors be informed of the requirements for submission of payment requests and the municipal retainage policy?

4. Processing Change Orders

Who will represent the municipality in negotiating construction change orders? (Project manager, construction manager, technical advisor, legal advisor, other:

Who will prepare the change order documentation? (Project manager or technical advisor):

Who will have the authority to approve negotiated construction change orders for the municipality? (Authorized representative, project manager):

What time limit has been set for completing change orders? _____

5. Management of Claims

Who will represent the municipality in responding to construction claims for the municipality? (Project manager, construction manager, technical advisor, legal advisor, other):

What time limit has been set for responding to claims? _____

6. Other Construction Management Activities

What State and local utilities and municipal departments have been contacted about the proposed project and their cooperation obtained in meeting needs for construction and operations?

	Status
Electric	
Gas	
Water	
Department of Public Works	
Department of Transportation	
Telephone	
Police Department	
Other	

What provisions have been made to ensure that on-site safety and security requirements are being complied with?

Preparing to Operate the Facility, Closing Out Construction and Preparing for Final Audit

Who will represent the municipality at final inspection? _____

_____

Who will represent the municipality at final audit? _____

_____

Who has been designated the prime engineer for the one-year project performance certification period after start-up?

_____

Who will manage the activities of the prime engineer during the project performance certification period?

_____

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